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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,644	08/07/2000	Yu-Kung Hsiao	TSMC2000-085	3337

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EXAMINER	
KANG, DONGHEE	
ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/633,644	HSIAO ET AL.
	Examiner	Art Unit
	Donghee Kang	2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-15 and 18-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,6,8,9,11,13-15 and 18-23* is/are rejected.

7)☒ Claim(s) *7,10 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 1, 18 & 20 are objected to because of the following informalities:

In the claim 1:

line 13: the limitation "over the matrix of imaging sensors" is unclear. This should be deleted.

line 15: the limitation "said patterned color filter" should be "said **first** patterned color filter".

line 18: the limitation "the first color filter" should be "the first **patterned** color filter".

Line 19: the limitation "with" should be deleted.

In the through claim 1, the limitation "and/or" is unclear. The "or" should be deleted.

In claim 18, line 3: the limitation "the first first passivation layer" should be "the first passivation layer".

In claim 20, line 3: the limitation "said patterned color filter" should be "the second patterned color filter".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims **1-3, 5-6, 8-9, 11, 13 & 18-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka (US 6,040,591)in view of Baek (US 6,127,668) and further in view of Jie et al. (US 6,133,954).

Re claims **1, 20 & 21**, Otsuka teaches a method of fabricating a semiconductor color imager having a optical structure, comprising (Fig.5):

a semiconductor substrate (11) having a matrix of imaging sensors (2) formed thereon, each image sensor having a photosensitive area and a complementary non-photosensitive area, said matrix of imaging sensors being organized in a plurality of subsets;

forming a first matrix of light shields (13) over the non-photosensitive areas of the matrix of imaging sensors;

forming a first planarizing layer (14) over the matrix of imaging sensors;

forming a first patterned color filter layer (15) on the first planarizing layer, said patterned color filter layer being registered with the photosensitive areas of a first subset of the matrix of imaging sensors;

forming a second planarizing layer (16) on the first patterned color filter layer;

patterning a layer of microlens material (17) to form a first matrix of microlenses over the second planarizing layer, said first matrix of microlenzes being registered with the photosensitive areas in the matrix of imaging sensors; and

forming an overcoat layer (18) over the first matrix of microlenses, said overcoat layer having high transmittance, said overcoat layer providing patterned or uniform

optical compensation between the subsets of the matrix of the imaging sensors; whereby the performance of the color imager is optimized. *See also Col.3, line 56 – Col. 4, line 15.*

Otsuka does not teach depositing a passivating coating encapsulating a metal photoshield layer. However, Baek teaches depositing a passivating coating (43) encapsulating a metal photoshield layer (42). See Fig.3c & Col.3, line 61 – Col.4, line 7.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baek into the Otsuka's device in order to protect the metal photoshield layer.

Neither Otsuka nor Baek teaches forming a second patterned color filter and third polarization/patterned color filter layers.

Jie et al. in Fig.4H teach the second filter 49" and the third polarization/patterned color filter layers (46' & 50"). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Jie et al. into Otsuka's device as modified by Baek since a plurality of color filters, which are associated with the photodiodes provide color sensitivity.

Re claim **2**, Otsuka teaches the semiconductor substrate material is made of silicon.

Re claim **3**, Otsuka teaches the matrix of imaging sensors comprise CCD.

Re claim **5**, Otsuka teaches the overcoat layer is comprised of a negative type photoresist having refractive index adjusted to match the refractive index of the microlens material.

Re claim **6**, Otsuka teaches the overcoat layer is comprised of a patterned multiplayer stack (18 & 19) such that one or more color filters are thereby integrated with the overcoat material.

Re claim **8**, Otsuka teaches the elements of the first matrix of microlenses is comprised of hemispherical convex.

Re claim **9**, Otsuka teaches the microlens layer material is selected from the group of positive or negative conventional photolithographic materials.

Re claim **11**, Otsuka teaches the overcoat layer is comprised of a negative type photoresist to serve as a thermal barrier and protective encapsulant for a microlens layer material comprising a positive type photoresist.

Re claim **13**, Otsuka teaches the microlens focal length and depth of focal is adjusted by controlling the thickness and refractive index in the final fabrication step of the color imager.

Re claims **18-19**, Otsuka as modified by Baek does not teach a second & third matrix of light shields. Sano et al. teach the second (56) & third (58) matrix of light shields to prevent uneven sensitivity and blurred images. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teach of Sano into the Otsuka's device since three light shielding layers along the optical paths transmitting through the lens, even not entering the photodiode and scattered in the interior does not result in the flare light invading the adjacent photodiode, whereby uneven sensitivity and blurred images never occur.

Allowable Subject Matter

4. Claims 7, 10, & 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Prior art reference, taken along or in combination, do not teach or render obvious that a layer of microlens material is patterned to form a second matrix of microlenses over the first matrix of microlenses having a high transmittance undercoat, said second matrix of microlenses being registered with the first matrix of microlenses whereby a compound microlens structure and undercoat/overcoat layers are formed to satisfy optical specification and performance.

Prior art reference, taken along or in combination, do not teach or render obvious that the overcoat layer is exposed to calibrated dosages if ultraviolet or other irradiation to photopolymerizse the high transmittance overcoat material whereby the index of refraction, polarizing properties, spectral absorption characteristics are tailored and the overcoat material molecues are cross-linked to provide thickness control.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Maxiflex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Kang Donghee

Donghee Kang
Examiner
Art Unit 2811

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